IN THE DRAWINGS

Please amend FIG. 1 in accordance with the replacement sheet for FIG. 1 submitted herewith. The replacement sheet for FIG. 1 adds filter network 120 at the output of amplifier 112. Support for the amendment to FIG. 1 can be found on page 3, lines 31 – 33 of the specification.

REMARKS

This responds to the Office Action mailed on June 8, 2005. Reconsideration of the application is respectfully requested.

Claims 1 – 3, 5, 7, 8, 10 – 13, 15 – 21, 24 – 27, 30 and 32 are amended, claims 33 - 35 are canceled, and no claim are added; as a result, claims 1 - 32 are now pending in this application.

Submission of Formal Drawings

Three sheets of formal drawings are submitted herewith. It is believed that the drawings are in compliance with 37 C.F.R. 1.8. Fig. 1 is amended and identified as "REPLACEMENT SHEET." No other amendments are made to the drawings.

Allowable Subject Matter

Claims 10-14 were indicated to be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. § 112, second paragraph, set forth in the Office Action. Claims 10 – 13 have been amended to overcome the rejection(s) under 35 U.S.C. § 112, second paragraph, set forth in the Office Action and are believed to be in condition for allowance.

§112 Rejection of the Claims

Claims 33-35 were rejected under 35 USC § 112, first paragraph, as failing to comply with the enablement requirement. By this amendment, claims 33 – 35 have been cancelled without prejudice.

Claims 1-35 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 1 – 32 have been amended to clarify the configuration and operation of the various elements of the claims as noted by the Examiner. The Applicant would like to thank the Examiner for pointing these out.

Claim 1, for example, has been amended to recite that the filter has an input and an output, and that the capacitor and resistor are coupled between the input and the output in a

series-feedback path, and that the capacitor is coupled to the input of the filter and that the resistor is coupled to the output of the filter. The transconductor is to sense a voltage across the resistor to either source or sink additional input current at the input of the filter in proportion to the voltage.

Regarding claim 9, the filter network at the output of the amplifier is disclosed in Applicant's specification on page 3, lines 31 – 33. FIG. 1 has been amended to show this filter network.

Regarding claim 26, the reference frequency is used to downconvert a RF signal to a zero frequency signal (e.g., without any carrier frequency and without the downconversion to an intermediate frequency (IF) signal). Applicant's specification on page 8 describes a transceiver with this function and Applicant's FIG. 3 illustrates transceiver 304 that can perform direct downconversion. Claim 26 has been clarified to recite that a radio frequency signal is for use in down-converting. Similarly, claim 27 has been clarified to recite that the reference frequency is a local-oscillator frequency and is used to down-convert.

§102 & §103 Rejections of the Claims

Claims 1-4, 7, 8, 15, 16 and 33-35 were rejected under 35 USC § 102(b) as being anticipated by Badger (U.S. 5,686,866). Claims 5, 6, 9 and 17-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Badger in view of Victor Co (JP 09294051A) and further in view of Fan (U.S. 6,693,494). Claims 24-32 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Gillig et al. (U.S. 5,424,689) in view of Badger.

As amended, Applicant's claim 1 is directed to a filter having a capacitor and resistor coupled between the input and the output of the filter in a series-feedback path. As recited in claim 1, the capacitor is coupled to the input of the filter and the resistor is coupled to the output of the filter. The filter also includes a transconductor to sense a voltage across the resistor to either source or sink additional input current at the input of the filter in proportion to the voltage.

Badger does not show a capacitor and resistor in a series feedback path where the capacitor is coupled to an input of the filter. In Badger, capacitor 18 is coupled to the output (see Badger FIG. 4).

Furthermore, the transistors Q1 and Q2 of Badger do not source sink additional *input* current at an input of the filter. In Badger, transistors Q1 and Q2 source or sink current *from a point between* resistor 20 and capacitor 18 (see Badger FIG. 4). Badger states that "conductive transistor Q1, Q2 couples capacitor 18 to an appropriate power supply source ... through resistor 36" and that "this action provides additional sinking/sourcing current from the external power supply ... to charge capacitor 18 in a shorter period of time" (see Badger, column 4, lines 3 – 8).

Badger further states that PLL 10 sinks or sources current to charge (or discharge) integrating capacitor 18 (see Badger abstract and column 3, lines 54 – 55).

Applicant's claim 2, as amended, recites that the action of the transconductor and the capacitor are to provide a larger capacitance than the capacitor alone. Badger's current sourcing/sinking actually charges the capacitor in a ***shorter*** period of time making the capacitor act as a ***smaller*** capacitor (see Badger, column 4, lines 5 – 8). Applicant's sourcing or sinking of current by the transconductor in Applicant's claim 1 ***makes the capacitor appear larger***. The larger capacitance provided by the operation of the transconductor in conjunction with the capacitor provides a lower frequency pole for Applicant's filter. Without the additional current sourced or sunk by the transconductor, a larger physical capacitor would be required to provide the lower frequency pole. In this way, smaller physical capacitor can function as a larger capacitance.

One problem with conventional filters is that a large capacitance may be required to provide a lower frequency pole. In frequency synthesizer applications, a large capacitor may also be used to help reduce noise. A large capacitor unfortunately consumes a significant portion of chip area. In some conventional filters, this capacitor is so large that it is fabricated off-chip. Large capacitors may reduce reliability and increase cost. As can be seen the use of a smaller physical capacitor that functions as a larger capacitor has many benefits.

In view the above discussion, Applicant submits that Badger ***teaches away*** from Applicant's claimed invention as recited in claim 1 by sourcing/sinking current in a ***shorter*** period of time making the capacitor act as a ***smaller*** effective capacitor.

Applicant's claim 5, as amended, further distinguishes over Badger by reciting that the capacitor in the series-feedback path is a first capacitor, and wherein the filter further comprises a second capacitor in a parallel feedback path of the amplifier coupled between the input and the

output of the filter. The second capacitor provides an additional pole of the filter. Badger has no second capacitor coupled between the input and the output. In Badger, capacitor 18 and capacitor 22 are in series (see Badger FIG. 4). Applicant's second capacitor, on the other hand, is recited to be in a feedback path that is parallel to the feedback path that includes the first capacitor.

Applicant's claim 6 further distinguishes over Badger by reciting that a frequency of the additional pole is greater than a frequency of the pole provided by the larger capacitance. As previously discussed, Badger's current sourcing/sinking actually charges the capacitor in a ***shorter*** period of time making the capacitor act as a ***smaller*** capacitor (see Badger, column 4, lines 5 – 8). This may increase the frequency of the pole in Badger.

Independent claim 15, for example, recites lowering a frequency of a pole provided by the capacitor by generating a larger capacitance resulting from the either sourcing or sinking current by operation of the transconductor.

In view of the above, Applicant submits that Badger does not anticipate Applicant's amended claims 1-4, 7, 8, 15 and 16 and that rejection of claims 1-4, 7, 8, 15 and 16 under 35 U.S.C. § 102(b) has been overcome.

Applicant further submits that there would be no motivation to combine Badger with any other references to result in Applicant's claimed invention since, as discussed above, Badger ***teaches away*** from Applicant's invention recited in claims 1, 15, 18 or 24. Specifically, the current sourcing/sinking in Badger is stated to charge the integrating capacitor in a ***shorter*** period of time making the capacitor act as a ***smaller*** capacitor (see Badger, column 4, lines 5 – 8). Applicant's sourcing or sinking of current by the transconductor in Applicant's claim 1 ***makes the integrating capacitor appear larger***. The use of Applicant's filter recited in claims 1, 15, 18 or 24 may reduce die area while Badger requires an increased die area.

Applicant further submits the combination of Badger with Victor Co, Fan, and/or Gillig does not result in Applicant's invention recited in either claim 1, 15, 18 or 24 because none of the references, either separately or in combination, teach suggest or motivate the filter of claim 1, the method of claim 15 which lowers the frequency of a pole, the frequency synthesizer with the loop filter of amended claim 18, a wireless device with the loop filter of claim 14, or the system with the loop filter of claim 30. No reference discloses a filter having a capacitor and resistor

coupled between the input and the output of the filter in a series-feedback path, in which the capacitor is coupled to the input of the filter and the resistor being coupled to the output of the filter, and wherein a transconductor senses a voltage across the resistor to either source or sink additional input current at the input of the filter in proportion to the voltage.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. Reconsideration is requested. The Examiner is invited to telephone Applicants' attorney, Greg Gorrie at (480) 659-3314, or Applicants' below-named representative at (612) 349-9592 to facilitate the prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

MALCOLM H. SMITH

By his Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
Attorneys for Intel Corporation
P.O. Box 2938
Minneapolis, Minnesota 55402
(612) 349-9592

Date Aug. 3, 2005

By Ann M. McCrackin
Ann M. McCrackin
Reg. No. 42,858

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5 day of August 2005.

John D Gustav Worthall

Name

Signature